



National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

Log 2712A

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In reply refer to: A-98-72 through -79

Honorable Jane F. Garvey
Administrator
Federal Aviation Administration
Washington, D.C. 20591

About 0554 eastern daylight time,¹ on September 5, 1996, a Douglas DC-10CF, N68055, operated by the Federal Express Corporation (FedEx) as flight 1406, made an emergency landing at Stewart International Airport (Stewart), Newburgh, New York, after the flightcrew determined that there was smoke in the cabin cargo compartment. The flight was operating under the provisions of Title 14 Code of Federal Regulations (CFR) Part 121 as a cargo flight from Memphis, Tennessee, to Boston, Massachusetts. Three crewmembers and two nonrevenue passengers were aboard the airplane. The captain and flight engineer sustained minor injuries while evacuating the airplane. The airplane was destroyed by fire after the landing.

The National Transportation Safety Board determined that the probable cause of this accident was an in-flight cargo fire of undetermined origin.²

Crew Coordination

Although the airplane was landed successfully, several required items were not accomplished during the descent and landing. The flight engineer failed to perform step No. 6 of the "Cabin Cargo Smoke Light Illuminated" checklist (pulling the cabin air shutoff T-handle).³ If he had done so, airflow would have been shut off to the main cargo deck area while being maintained to the cockpit. The Safety Board concludes that the flight engineer's failure to pull the cabin air shutoff T-handle, as required by the "Cabin Cargo Smoke Light Illuminated" checklist, allowed the normal circulation of air to continue to enter the main cargo area, thereby providing the fire with a continuing source of oxygen and contributing to its rapid growth. However, the Safety Board could not determine the degree to which it might have contributed to the severity of the fire.

¹ Unless otherwise indicated, all times are eastern daylight time, based on a 24-hour clock.

² National Transportation Safety Board. 1998. *In-Flight Fire/Emergency Landing, Federal Express Flight 1406, Douglas DC-10-10, N68055, Newburgh, New York, September 5, 1996*. Aircraft Accident Report NTSB/AAR-98/03. Washington, DC.

³ Although the cockpit voice recorder (CVR) recorded the flight engineer stating, "pull cabin air" at 0538.40, its position after the accident indicates that the cabin air shutoff T-handle had not been pulled.

The flight engineer also failed to complete step No. 7 of the "Cabin Cargo Smoke Light Illuminated" checklist (to maintain a 0.5 psi differential cabin pressure). As a result, the occupants were unable to immediately open and exit from the primary evacuation exits (the L1 and R1 doors) because the airplane was still pressurized. The flight engineer acknowledged that instead of manually maintaining the appropriate pressure differential, after he had placed the outflow valve control in the manual position, he only "cranked it open a couple of times [turns]." Because they were at 33,000 feet and operating on only one pressurization pack, the outflow valve would have been almost completely closed before the flight engineer cranked it. As demonstrated in the Safety Board's test on a similar DC-10, manually cranking the outflow valve control two times will not perceptibly open the outflow valve from fully closed on a static airplane. The Safety Board concludes that the evacuation was delayed because the flightcrew failed to ensure that the airplane was properly depressurized.

The CVR transcript reveals that the flight engineer was overloaded and distracted from his attempts to accomplish the "Fire & Smoke" and "Cabin Cargo Smoke Light Illuminated" emergency checklists (in addition to his normal descent and before-landing checklist duties) by his repeatedly asking for the three-letter identifier for Stewart so that he could obtain runway data for that airport.

After the accident, the captain said that he had allowed the first officer to continue flying the airplane during the emergency so that he could coordinate with air traffic control and work with the flight engineer on completing the checklists. This should have resulted in an effective apportionment of the workload among the three crewmembers, in that the flying pilot would not have been overly distracted from flying the airplane, the flight engineer would have received needed assistance with his duties,⁴ and the captain would have had the opportunity to oversee the actions of both. However, the Safety Board is concerned that, despite the captain's stated intention to serve in a monitoring and coordinating role, he failed to provide sufficient oversight and assistance to ensure completion of all necessary tasks.

The captain did not call for any checklists to address the smoke emergency, which was contrary to FedEx procedures.⁵ (The flight engineer initiated the "Fire & Smoke" and "Cabin Cargo Smoke Light Illuminated" checklists.) Nor did he explicitly assign specific duties to each of the crewmembers. The captain also did not recognize the flight engineer's failure to accomplish required checklist items, provide the flight engineer with effective assistance, or intervene to adjust or prioritize his workload. In fact, the captain repeatedly interrupted the flight engineer during his attempts to complete the "Fire & Smoke" checklist,⁶ thereby distracting him further from those duties.

⁴ At the time of the accident, the flight engineer had only 188 hours as a DC-10 flight engineer and had been working for FedEx for less than 6 months.

⁵ The FedEx DC-10 Flight Manual indicates, under "Emergency and Abnormal Checklist Procedures," that "Phase One [memory]" items are to be "performed when directed by the Captain." Further, it states, "all checklists containing Phase One items should be requested by the Captain by name" and strongly recommends that the captain and flight engineer "work together on the review of the Phase One items and the accomplishment of the Phase Two items."

⁶ At 0538:38 and 0539:13, the captain interrupted him to ask whether he had run a test on the smoke detector system, which is not an item listed on the checklist.

Further, the captain did not initiate the "Emergency Evacuation" checklist, which was required to be initiated during the preparation for landing. The "Emergency Evacuation" checklist includes depressurizing the airplane before landing. If this checklist had been initiated, it would have provided another opportunity for the crew to accomplish the necessary depressurization that was missed on the "Fire & Smoke" checklist. In addition, the captain told investigators that he did not initiate the emergency descent checklist, but said he thought he had accomplished the items on that checklist by memory. Although the emergency descent checklist (titled "Rapid Depressurization/Emergency Descent") was probably not applicable to this situation, the captain's statement is troubling because it suggests a belief that checklist items can be adequately accomplished from memory alone. Finally, the CVR transcript indicates that the captain did not call for an emergency evacuation. (After the captain said "we need to get...out of here," the flight engineer said "emergency ground egress.")

The Safety Board concludes that the captain did not adequately manage his crew resources when he failed to call for checklists or to monitor and facilitate the accomplishment of required checklist items. Therefore, the Safety Board believes that the Federal Aviation Administration (FAA) should require the principal operations inspector (POI) for FedEx to review the crew's actions on the accident flight and evaluate those actions in the context of FedEx emergency procedures and training (including procedures and training in crew resource management) to determine whether any changes are required in FedEx procedures and training.

Crew's Use of Emergency Equipment

Within 48 seconds after the first indication of a problem, the crew donned oxygen masks, as required by the "Fire & Smoke" checklist. The captain elected not to don his smoke goggles because they did not fit over his eyeglasses and they were dirty and scratched. The first officer elected not to wear his smoke goggles because he felt that they unduly restricted his peripheral vision. The flight engineer put his smoke goggles on but subsequently removed them because there was no smoke in the cockpit.

The Safety Board is concerned that cockpit smoke may affect crewmembers' vision, imperiling their ability to operate the airplane or properly address the emergency. Evidence in this accident indicates that smoke did not enter the cockpit in significant amounts until after the crew landed and stopped the airplane. However, the Safety Board is concerned that under different circumstances, the failure of crewmembers to don smoke goggles or to keep the goggles on during an emergency could adversely affect the outcome.

In connection with its investigation of the May 11, 1996, accident involving ValuJet flight 592,⁷ the Safety Board concluded that there is inadequate guidance for air carrier pilots about the need to don oxygen masks and smoke goggles immediately in the event of a smoke emergency. In Safety Recommendation A-97-58, the Safety Board asked the FAA to issue guidance on this point to air carrier pilots. In a November 17, 1997, response, the FAA indicated it would issue a flight standards handbook bulletin in November 1997 containing guidance on procedures to don protective breathing equipment (PBE) for smoke and fume protection. The FAA did not issue the bulletin.

⁷ National Transportation Safety Board. 1997. *In-flight Fire and Impact with Terrain, ValuJet Airlines Flight 592, DC-9-32, N904VJ, Everglades, near Miami, Florida, May 11, 1996*. NTSB/AAR-97/06. Washington, DC

Recently, it has been learned that the bulletin will not be issued until after the FAA reviews the results of a special emphasis inspection of smoke goggles during en route and ramp inspections. On March 20, 1998, the FAA called for this special survey of smoke goggles as part of its response to Safety Recommendation A-97-60 (also from the ValuJet report), which sought a requirement that smoke goggles currently approved for use by the flightcrews of transport-category aircraft be packaged in such a way that they can be easily opened by the flightcrew. The survey has been completed, and the FAA is reviewing the results. The Board has been assured that the FAA is still in agreement with the intent of the recommendations addressing flightcrew smoke goggles and that action on Safety Recommendations A-97-58, -59, and -60 will follow the results of the survey. The Board is very concerned that the issuance of the guidance bulletin regarding the need for flightcrews to don smoke goggles at the first indication of a possible in-flight smoke or fire emergency has been delayed until after the completion and review of the special survey. Based on this delay, the Board classifies Safety Recommendation A-97-58 "Open—Unacceptable Response."

In the ValuJet report, the Safety Board also concluded that the smoke goggle equipment currently provided on most air carrier transport aircraft requires excessive time, effort, attention, and coordination by the flightcrew to don and, in Safety Recommendation A-97-59, asked the FAA to establish a performance standard for the rapid donning of smoke goggles and ensure that all air carriers meet this standard through improved smoke goggle equipment, improved flightcrew training, or both. In response, the FAA indicated that it believed the intent of this recommendation is addressed in 14 CFR 121.337, which establishes standards for PBE for smoke and fume protection and requires that the equipment be conveniently located on the flight deck and easily accessible for immediate use. However, there is no standard for the optimum equipment location that will facilitate quick donning of such equipment or for the time required to don the equipment. The FAA also stated that it would issue a flight standards handbook bulletin to provide additional guidance on the location and donning of this equipment and procedural guidance on flightcrew training requirements. However, it did not address the recommendation to establish a standard to ensure that, through equipment design, equipment installation, or flightcrew training, a specific performance standard is achieved for donning smoke goggles. The FAA has indicated that it will await the results of the special emphasis inspection before it takes further action. The Safety Board classifies Safety Recommendation A-97-59 "Open—Unacceptable Response."

This accident again demonstrates that crews may not use the equipment currently available and that some characteristics of the current equipment may interfere with the flightcrew's performance of its duties. Accordingly, the Safety Board reiterates Safety Recommendations A-97-58 and -59.

During the evacuation, the flight engineer stated that before he entered the foyer area to evacuate via the R1 door, he filled his lungs with oxygen from his oxygen mask. He did not use the PBE, which would have provided him with protection from the smoke while he attempted to open the foyer doors. In postaccident interviews, he stated that he was anxious to open the exit doors quickly, and he forgot that the PBE was available. The Safety Board concludes that crewmembers who do not use PBE during a smoke or fire emergency may place themselves at unnecessary risk in attempting to address or escape from the situation. Although most carriers' emergency evacuation checklists instruct crewmembers to don PBE when circumstances warrant, there is no reference to the PBE in the FedEx "Emergency Evacuation" checklist. Therefore, the Safety Board believes that the FAA should require FedEx to modify its evacuation checklist and training to emphasize the availability of PBE during evacuations in an environment containing smoke, fire, or toxic fumes.

The L-1 door was not available as an emergency exit because it only opened partially as a result of the flight engineer's attempt to open the door while the airplane was still pressurized. When there is no electric power to the airplane the motor that operates the door is powered by a charged air bottle. If an attempt is made to open the door when the cabin pressure differential is above 0.5 psi, the bottle pressure will bleed off and the door will not open. Although the lack of the L-1 door as an escape route was not a significant factor in this accident, the Safety Board is concerned that under other circumstances the loss of a passenger exit door could have serious safety consequences. The Safety Board concludes that crewmembers may not be adequately aware that attempting to open a passenger exit door when the airplane is still pressurized may result in the door not opening. Therefore, the Safety Board believes that the FAA should require all Part 121 operators of airplanes that rely on air pressure to operate exit doors to make crewmembers aware of the circumstances of this accident and remind them of the need to ensure that the airplane is depressurized before attempting to open the passenger exit doors in an emergency.

Dissemination of Hazardous Materials Information

After the occupants had successfully evacuated the airplane, the most immediate problem for the firefighters and other emergency responders was to prevent the fire from spreading and involving the fuel that remained on the airplane. In this case, the unavailability to the incident commander of specific information about the declared hazardous materials on board did not affect the firefighting strategy of the New York Air National Guard (NY ANG). Nevertheless, in accidents that involve hazardous materials, it is critical that firefighters and other emergency responders receive timely information regarding the identity, quantity, number of packages, and location of declared hazardous materials. Such information can influence the type and level of response and may be necessary to adequately protect emergency response personnel, the environment, and the surrounding communities.

Neither the assistant fire chief who served as the initial incident commander nor the ANG fire chief received specific information during the firefighting phase of the emergency (before 0925) about the identity of the hazardous materials, their quantities, or the number of packages on the airplane. By 0700, about 1 hour after the airplane had landed, the only information about the hazardous materials on board the airplane that had been provided to the initial incident commander came from the Part A form and a handwritten list provided by the FedEx station at the airport. This information indicated only the hazard classes of the hazardous materials on board the airplane and their location in the airplane by cargo container position. Emergency guidance about specific chemicals was available through the Orange County Hazardous Materials Response Team (HMRT) and its communications link to CHEMTREC; however, this information was of little use until the specific identity and quantities of the declared hazardous materials on board the airplane were known. About 0915, approximately 10 minutes before the fire was extinguished, the fire chief received from the Orange County HMRT coordinator a copy of the weight and load plan and a handwritten list identifying some of the chemicals on board.

The NY ANG and other participating emergency response agencies, including airport operations at Stewart, repeatedly requested specific information about the hazardous materials on board the airplane. Throughout the morning (beginning at 0635) and into the early afternoon, FedEx, primarily through its Global Operations Command Center in Memphis, faxed as many as 12 transmissions of various hazardous materials shipping documents to the emergency operations center

(EOC) at the airport operations building and the New York State Police barracks at Stewart, although many of the faxes were illegible. However, none of these reached the incident commander.

Another problem was that FedEx did not have the capability to generate, in a timely manner, a single list indicating the shipping name, identification number, hazard class, quantity, number of packages, and the location of each declared shipment of hazardous materials on the airplane. To prepare such a list, FedEx would have had to compile information from copies of all of the individual Part Bs for each individual shipment of hazardous materials on the airplane. Because FedEx did not have the capability to quickly consolidate that information, it relied on faxing copies of the individual Part Bs for the approximately 85 hazardous materials packages on board, which proved to be burdensome, time consuming and, in this case, ineffective. Also, because of the poor quality and legibility of many of the handwritten Part Bs, much of the information was unusable.

In contrast, railroads operating freight trains can generate a computerized list of all of the freight cars in the train that identifies which freight cars are transporting hazardous materials and provides the shipping name, hazard class, identification number, and type of packaging, quantity, and emergency response guidance for each hazardous material transported. Such a printed, comprehensive list can be generated quickly and thus the information can be provided in a timely fashion to the appropriate emergency responders and in a more useful format than numerous faxed copies of partially legible Part B forms.

In both this accident and the July 31, 1997, crash of the FedEx MD-11 at Newark, the on-board Part B hazardous materials shipping papers were not available to emergency responders,⁸ and FedEx was unable to provide complete information to emergency responders in a timely manner. Further, in two subsequent accidents (one near Clarksville, Tennessee, on March 5, 1998, and the other at Bismarck, North Dakota, on April 7, 1998), the effectiveness of FedEx's hazardous materials recordkeeping system was again called into question. In the Clarksville accident, the shipping papers on board the airplane and on file at FedEx's Memphis Operations Center were found to be inaccurate. And in the Bismarck accident, FedEx was unable to confirm whether there were hazardous materials on board the airplane until 2 hours and 49 minutes after receiving the request for this information.

Safety Board investigators surveyed the capability of other carriers to provide this information in similar circumstances and found that only one carrier had an on-line capability to provide detailed information about the hazardous materials on board its airplane. The remaining carriers, like FedEx, rely on paper copies of the hazardous material shipping documentation retained at the departing station if the on-board documentation is destroyed. The Safety Board is pleased that FedEx has committed to developing and implementing an electronic system for tracking and retrieving information about hazardous materials being carried on board FedEx flights. FedEx plans to implement intermediate and long-term plans that would make computerized information about hazardous materials information available from all FedEx facilities. However, the Safety Board does not agree with FedEx's position that the proper shipping name is not relevant to emergency responders. Although this information may not always be required, in many cases it may be vital

⁸ The DOT hazardous materials regulations [49 CFR Part 173] require that the proper shipping name, hazard class, identification number, packaging group, and total quantity of the material appear on the shipping papers for any shipment of hazardous materials. Further, the regulations stipulate [49 CFR Part 175] that an operator must provide this information in writing to the pilot-in-command and that a copy of the shipping papers must accompany the shipment on board the airplane.

that emergency responders know exactly what substances are on board an aircraft so that appropriate measures can be taken to address potential risks.

Compared to the other modes of transportation, it is less likely that shipping papers on board an accident aircraft will survive or be accessible because of the greater likelihood of fire and destruction of the airplane. Because of the danger of fire, a flightcrew is also less likely to have time to retrieve the shipping papers after a crash. The Safety Board concludes that the DOT hazardous materials regulations do not adequately address the need for hazardous materials information on file at a carrier to be quickly retrievable in a format useful to emergency responders. Therefore, the Safety Board believes that the FAA and the Research and Special Programs Administration should require, within 2 years, that air carriers transporting hazardous materials have the means, 24 hours per day, to quickly retrieve and provide consolidated, specific information about the identity (including proper shipping name), hazard class, quantity, number of packages, and location of all hazardous materials on an airplane in a timely manner to emergency responders.

Another obstacle in this case to emergency responders receiving hazardous materials information was FedEx's inappropriate statement to the ANG command post (at about 1300) that copies of the hazardous materials shipping documentation could not be provided to them because the Safety Board had taken over the investigation. This created the false impression that such information could not be released without the Safety Board's approval. FedEx later stated that this was consistent with company policy that once the Safety Board has taken control of an aircraft accident investigation, all information pertaining to that investigation should be forwarded to the Safety Board. Although the Safety Board appreciates FedEx's efforts to recognize the Board's primacy in aircraft accident investigations, the Safety Board has not promoted, nor does it support, a policy that would interfere with a carrier's ability to assist emergency responders in transportation emergencies, especially when hazardous materials are involved. The Safety Board concludes that FedEx's policy of providing information only to the Safety Board after the Safety Board initiates an investigation is inconsistent with the need to quickly provide emergency responders with essential information to assess the threat to themselves and the local community. Therefore, the Safety Board believes that the FAA should require the POI for FedEx to ensure that all FedEx employees who may communicate with emergency responders about a transportation accident involving hazardous materials understand that they should provide those emergency responders with any available information about hazardous materials that may be involved.

Emergency Response

Postaccident evaluations by airport personnel and representatives of the participating agencies indicated that many believed that communication and coordination among the agencies were lacking during the emergency response. Although all participating agencies recognized the ANG fire chief as the incident commander,⁹ representatives from these agencies had differing opinions about who was to be present at the EOC, who was in charge at the EOC, the role of other agencies (including the Safety Board), and which emergency plan had been implemented in this accident. Although each of the participating agencies has conducted drills and exercises under their respective emergency plans for transportation and nontransportation hazardous materials incidents, joint exercises had not been conducted at Stewart for a simulated hazardous materials incident. The

⁹ The assistant fire chief on duty served as incident commander until 0700, when the fire chief arrived on scene.

failure of the incident commander to receive the hazardous materials information that was being provided to other emergency responders indicates that communication and coordination among the participating agencies were not effective. Further, inadequate emergency preplanning and coordination among the responding emergency response agencies resulted in confusion about the responsibilities of the participating agencies and contributed to the failure of information about the hazardous materials on the airplane to reach the incident commander.

The Safety Board concludes that more effective preparation for emergencies involving hazardous materials and a system for coordination among the ANG, Stewart International Airport management, and all local and State emergency response agencies are needed. The Safety Board recognizes that after this accident Stewart revised its emergency plan, and that airport operations personnel at Stewart have acknowledged the need to address those deficiencies in the airport's emergency plan. However, the Safety Board is concerned that FAA requirements¹⁰ do not specifically address the need to prepare for hazardous materials emergencies, and that other airports may be similarly unprepared for hazardous materials emergencies. The Safety Board concludes that airport emergency plans should specifically address hazardous materials emergencies. Therefore, the Safety Board believes that the FAA should require all certificated airports to coordinate with appropriate fire departments, and all State and local agencies that might become involved in responding to an aviation accident involving hazardous materials, to develop and implement a hazardous materials response plan for the airport that specifies the responsibility of each participating local, regional, and State agency, and addresses the dissemination of information about the hazardous materials involved. Such plans should take into consideration the types of hazardous materials incidents that could occur at the airport based on the potential types and sources of hazardous materials passing through the airport. The Safety Board also believes that the FAA should require airports to coordinate the scheduling of joint exercises to test these hazardous materials emergency plans.

Firefighters were positioned on scene before the airplane landed and began firefighting efforts immediately. Although the firefighters initially attempted to conduct an interior attack on the fire from the foyer area, the location of the cargo containers prevented them from approaching the seat of the fire. After the cargo door was opened, firefighters observed orange flames and heavy smoke in the airplane, and the incident commander evacuated them from the airplane. The initial incident commander's decision to evacuate the firefighters from the interior of the airplane was appropriate given the danger posed by the smoke and fire-filled airplane. However, the initial incident commander acknowledged that use of the skin penetrator agent application tool to penetrate the fuselage was delayed while he attempted to accommodate the flight engineer's request that damage to the airplane be minimized.¹¹ Although it is not clear whether an earlier entry would have improved the effectiveness of the firefighting efforts in this case, the Safety Board is concerned that more aggressive measures to enter the airplane, such as use of a fuselage penetrating tool, were not taken sooner. The Safety Board notes that the ANG fire chief testified that based on "lessons learned" from this accident, if a similar situation were to occur, he would immediately "get right in there with a hand line and deploy some type of penetrating tool on the outer skin of the aircraft."

¹⁰ 14 CFR 139.325 specifies what must be included in airport emergency plans of airports certificated under Part 139.

¹¹ The assistant fire chief who served as the initial incident commander testified that at the flight engineer's suggestion a telephone call was placed to the airplane manufacturer (Douglas) in an unsuccessful attempt to determine whether there were alternate means for entering the airplane.

The Safety Board has long been concerned about the lack of success of airport fire departments in extinguishing interior fires.¹² On June 4, 1996, the FAA published "Airport Rescue and Firefighting Mission Response Study," in the *Federal Register* and invited comments from interested parties. According to the *Federal Register* notice, the study was undertaken to compare the mission and requirements for civil airport fire services to those of the Department of Defense. On August 1, 1996, the Safety Board commented:

[T]he current mission set forth in 14 CFR Part 139 to "provide an escape path from a burning airplane" no longer suffices. The Safety Board supports a full study of the mission statement by the FAA with a view towards providing adequate [aircraft rescue and firefighting (ARFF)] resources to rapidly extinguish aircraft interior fires and to extricate aircraft occupants from such interior fires. All aspects of this issue, including staffing, extinguishing agents, firefighter training, and response times, should be evaluated and compared with DOD standards to develop a broader mission statement that includes interior cabin fire suppression and extrication of aircraft occupants.

Accident history suggests that the environment inside a burning airplane's interior may be beyond the current technological capabilities of fire departments to extinguish within adequate time frames to successfully evacuate occupants or protect cargo. The Safety Board is aware that the FAA has researched fire extinguishing systems for airplane interiors, including testing of a water spray system that would discharge water into a particular area of the airplane when triggered by sensors in that area. Because the system would discharge water only to a focused area of potential fire, it would minimize the total amount of water that would need to be carried on board, thereby reducing the weight penalty of such a system. FAA tests showed that when this system was used to fight a fire, it delayed the onset of flashover, reduced cabin air temperatures, improved visibility, and increased potential survival time.

The Safety Board is concerned about the number of losses that have occurred and concludes that currently, inadequate means exist for extinguishing on-board aircraft fires. Therefore, the Safety Board believes that the FAA should reexamine the feasibility of on-board airplane cabin interior fire extinguishing systems for airplanes operating under 14 CFR Part 121 and, if found feasible, require the use of such systems.

The Safety Board realizes that requiring on-board extinguishing systems may not entirely resolve these safety concerns because they may become disabled by crash impacts. Further, the Safety Board realizes that the full implementation of such technology will require a number of years. Therefore, the Safety Board concludes that in addition to the safety benefits provided by on-board extinguishing systems, ARFF capabilities must also be improved so that firefighters are able to extinguish aircraft interior fires in a more timely and effective manner. Therefore, the Safety Board believes that the FAA should review the aircraft cabin interior firefighting policies, tactics, and

¹² Air Canada DC-9-32 in Covington, Kentucky, June 2, 1983 (23 persons killed by smoke/and or fire); USAir 737 collision with a Skywest Fairchild Metro 227 in Los Angeles, California, on February 1, 1991 (22 persons killed by smoke/and or fire); Northwest Airlines DC-9 collision with a Northwest 727 in Detroit, Michigan, on December 3, 1990 (eight persons killed by smoke and/or fire); Air Transport International DC-8-62 in Jamaica, New York, on March 12, 1991 (freight only); Ryan International Airlines B-727 in Hartford, Connecticut, on May 3, 1991 (freight only); and TWA Lockheed L1011 in Jamaica, New York, on July 30, 1992.

procedures currently in use, and take action to develop and implement improvements in firefighter training and equipment to enable firefighters to extinguish aircraft interior fires more rapidly.

As a result of the investigation of this accident, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Require the principal operations inspector for Federal Express (FedEx) to review the crew's actions on the accident flight and evaluate those actions in the context of FedEx emergency procedures and training (including procedures and training in crew resource management) to determine whether any changes are required in FedEx procedures and training. (A-98-72)

Require Federal Express to modify its evacuation checklist and training to emphasize the availability of protective breathing equipment during evacuations in an environment containing smoke, fire, or toxic fumes. (A-98-73)

Require all Part 121 operators of airplanes that rely on air pressure to open exit doors to make crewmembers aware of the circumstances of this accident and remind them of the need to ensure that the airplane is depressurized before attempting to open the passenger exit doors in an emergency. (A-98-74)

Require, within 2 years, that air carriers transporting hazardous materials have the means, 24 hours per day, to quickly retrieve and provide consolidated, specific information about the identity (including proper shipping name), hazard class, quantity, number of packages, and location of all hazardous materials on an airplane in a timely manner to emergency responders. (A-98-75)

Require the principal operations inspector for Federal Express (FedEx) to ensure that all FedEx employees who may communicate with emergency responders about a transportation accident involving hazardous materials understand that they should provide those emergency responders with any available information about hazardous materials that may be involved. (A-98-76)

Require all certificated airports to coordinate with appropriate fire departments, and all State and local agencies that might become involved in responding to an aviation accident involving hazardous materials, to develop and implement a hazardous materials response plan for the airport that specifies the responsibility of each participating local, regional, and State agency, and addresses the dissemination of information about the hazardous materials involved. Such plans should take into consideration the types of hazardous materials incidents that could occur at the airport based on the potential types and sources of hazardous materials passing through the airport. Airports should also be required to coordinate the scheduling of joint exercises to test these hazardous materials emergency plans. (A-98-77)

Reexamine the feasibility of on-board airplane cabin interior fire extinguishing systems for airplanes operating under 14 Code of Federal Regulations Part 121 and, if found feasible, require the use of such systems. (A-98-78)

Review the aircraft cabin interior firefighting policies, tactics, and procedures currently in use, and take action to develop and implement improvements in firefighter training and equipment to enable firefighters to extinguish aircraft interior fires more rapidly. (A-98-79)

Additionally, the Safety Board reiterates the following recommendations to the FAA:

Issue guidance to air carrier pilots about the need to don oxygen mask and smoke goggles at the first indication of a possible in-flight smoke or fire emergency. (A-97-58)

Establish a performance standard for the rapid donning of smoke goggles; then ensure that all air carriers meet this standard through improved smoke goggle equipment, improved training, or both. (A-97-59)

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in these recommendations.

By:


Jim Hall
Chairman